

WHAT IS CLAIMED IS:

1. A method for fabricating a rotor blade for a gas turbine engine, said method comprising:

providing a rotor blade that includes an airfoil, a platform, a shank, and a dovetail, wherein the shank extends between the platform and the dovetail, and wherein the platform extends between the airfoil and the shank, wherein the platform includes a leading edge side and a trailing edge side connected together by a pair of opposing sidewalls;

forming an undercut in a portion of the platform to facilitate cooling the trailing edge side of the platform during operation; and

forming a purge slot in a portion of the platform to facilitate channeling downstream towards the platform trailing edge side.

2. A method in accordance with Claim 1 wherein said forming a purge slot in a portion of the platform further comprises forming the purge slot with a substantially elliptical cross-sectional profile.

3. A method in accordance with Claim 1 wherein said forming a purge slot in a portion of the platform further comprises further comprises forming the purge slot with a radius of curvature.

4. A method in accordance with Claim 1 wherein the platform includes a radially inner surface and a radially outer surface, said forming a purge slot in a portion of the platform further comprises forming the purge slot within a portion of the platform radially inner surface.

5. A method in accordance with Claim 4 wherein said forming an undercut in a portion of the platform further comprises forming the undercut between the platform radially inner and outer surfaces.

6. A method in accordance with Claim 1 wherein the platform comprises a pressure side and a suction side, said forming an undercut in a portion of the platform further comprises forming the undercut in a portion of the platform along the pressure side of the platform.

7. A method in accordance with Claim 1 wherein the platform comprises a pressure side and a suction side, said forming a purge slot in a portion of the platform further comprises forming the purge slot in a portion of the platform suction side.

8. A method in accordance with Claim 1 wherein the platform comprises a pressure side and a suction side, said forming a purge slot in a portion of the platform further comprises forming the purge slot in a portion of the platform of a first rotor blade to facilitate channeling cooling air towards an undercut formed in a circumferentially-spaced second rotor blade.

9. A rotor blade for a gas turbine, said rotor blade comprising:

a platform comprising a radially outer surface and a radially inner surface, said platform radially inner surface comprising an undercut and a purge slot formed therein, said purge slot for channeling cooling air downstream therefrom, said undercut facilitates cooling a portion of said platform during engine operation;

an airfoil extending radially from said platform radially outer surface;

a shank extending radially from said platform radially inner surface;

and

a dovetail extending from said shank for coupling said rotor blade within the gas turbine engine.

10. A rotor blade in accordance with Claim 9 wherein said purge slot is formed with a substantially elliptical cross-sectional profile.

11. A rotor blade in accordance with Claim 9 wherein said purge slot is formed with a radius of curvature.

12. A rotor blade in accordance with Claim 9 wherein said platform further comprises a leading edge side and a trailing edge side connected together by a pair of opposing sidewalls, said purge slot formed within at least one of said platform sidewalls between said platform leading and trailing sides

13. A rotor blade in accordance with Claim 9 wherein said platform further comprises a suction side and a pressure side, said purge slot formed within a portion of said platform suction side.

14. A rotor blade in accordance with Claim 9 wherein said platform further comprises a suction side and a pressure side, said platform undercut formed within a portion of said platform pressure side.

15. A rotor blade in accordance with Claim 9 wherein said platform purge slot is configured to channel cooling air downstream from a shank cavity defined between a pair of circumferentially-spaced said rotor blades.

16. A rotor blade in accordance with Claim 9 wherein said rotor blade is configured to be coupled within a rotor assembly including a plurality of other rotor blades, said platform purge slot is configured to channel cooling air downstream towards an undercut formed within at least one of the other circumferentially-spaced rotor blades.

17. A rotor blade in accordance with Claim 9 wherein said platform purge slot is defined within said platform radially inner surface.

18. A rotor blade in accordance with Claim 9 wherein said platform undercut is formed between said platform radially inner and outer surfaces.

19. A rotor assembly for a gas turbine engine, said rotor assembly comprising:

a rotor shaft; and

a plurality of circumferentially-spaced rotor blades coupled to said rotor shaft, each of said rotor blades comprises an airfoil, a platform, a shank, and a dovetail, said airfoil extends radially outward from said platform, said platform comprises a radially outer surface and a radially inner surface, said shank extends radially inward from said platform, said dovetail extends from said shank for coupling said rotor blade to said rotor shaft, at least a first of said rotor blades comprising an undercut and a purge slot defined within a portion of said first rotor blade platform, said undercut facilitates cooling said platform, said purge slot facilitates channeling air downstream past said shank.

20. A rotor assembly in accordance with Claim 19 wherein each said rotor blade platform comprises a leading edge side and a trailing edge side coupled together by a suction-side sidewall and a pressure-side sidewall, said purge slot formed within at least one of said suction-side sidewall and said pressure-side sidewall.

21. A rotor assembly in accordance with Claim 20 wherein said first rotor blade platform purge slot is formed within a portion of said platform suction-side sidewall.

22. A rotor assembly in accordance with Claim 20 wherein said first rotor blade platform undercut is formed within a portion of said platform pressure-side sidewall .

23. A rotor assembly in accordance with Claim 20 wherein said first rotor blade purge slot has a substantially elliptical cross-sectional profile.

24. A rotor assembly in accordance with Claim 20 wherein said first rotor blade purge slot comprises a radius of curvature.

25. A rotor assembly in accordance with Claim 20 wherein said first rotor blade platform purge slot is configured to channel cooling air downstream from

a shank cavity defined between said first rotor blade and a circumferentially adjacent second rotor blade.

26. A rotor assembly in accordance with Claim 25 wherein said first rotor blade platform purge slot is configured to channel cooling air downstream towards an undercut formed within said second rotor blade.

27. A rotor assembly in accordance with Claim 20 wherein said first rotor blade platform purge slot is only defined within said first rotor blade platform radially inner surface.

28. A rotor assembly in accordance with Claim 20 wherein said first rotor blade platform undercut is formed between said first rotor blade platform radially inner and outer surfaces.